Curriculum Vitæ of Marco Martins Afonso
January, 2025 (Français and Português versions follow at the end of this document)

Personal data

Name :	Marco
Surname :	Martins Afonso
Birth :	Genoa (Italy), Friday September 21, 1979
Nationality :	Italian
Languages :	Italian, English, French, Portuguese, Genoese, Latin

Academic Institution

Address :	SIT Technologies; Università di Genova, DIME-MASET-TPG; via Montallegro 1, 16145 Genova, Italy (Villa Cambiaso - padiglioni F.019 F.037)
Membership :	Centro de Matemática da Universidade do Porto, CMUP; Departamento de Matemática da Faculdade de Ciências, FCUP; Rua do Campo Alegre, 687; 4169-007 Porto; Portugal
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Studies and positions

2024 –	Research fellowship at DIME-MASET-TPG, University of Genova (Italy).
2024	External consultancy at "SIT Technologies", University of Genova (Italy).
2022 – 2023	Research contract at the Centro de Matemática da Universidade do Porto (Portugal).
2015 – 2020	Post-doc position at the Centro de Matemática da Universidade do Porto (Portugal). Supervisor : Sílvio Marques de Almeida Gama.
2013 – 2014	Post-doc position in the group Instabilité Turbulence et Contrôle, Laboratoire de Mécanique Modélisation et Procédés Propres (Marseille, France). Supervisor : Eric Serre.
2011 – 2013	Post-doc position in the group Analyse Calcul Scientifique Industriel et Optimisation de Montpellier, Institut de Mathématiques et de Modélisation de Montpellier (France). Supervisor : Franck Nicoud.

2009 – 2011	Post-doc position in the group Particules Spray et Combustion, Institut de Mécanique des Fluides de Toulouse (France). Supervisor : Olivier Simonin.
2007 – 2008	Post-doc research scholarship at the Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD (USA). Supervisor : Charles Meneveau.
2006 – 2007	Post-doc fellowship at the Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israel). Supervisor : Gregory Falkovich.
2006	Ph.D. thesis: *Analytical models of turbulence: from large scales to small scales, and beyond.* Advisors : Roberto Festa, Andrea Mazzino, Guido Boffetta. Defence : Genova, May 22, 2006.
2003 – 2006	Ph.D. in Physics: University of Genova.
2002	Laurea thesis: "Un modello risolubile analiticamente di Large-Eddy Simulation di campi scalari passivi" (*An analytically solvable model of large-eddy simulation of passive scalar fields*). Advisors : Roberto Festa, Andrea Mazzino. Defence : Genova, July 10, 2002.
1997 – 2002	Undergraduate studies in Physics: University of Genova, final mark 110/110 cum laude.
1997	High-school degree: Scientific High School "G.D. Cassini" - Genova, final mark 60/60 cum laude.

Stages in foreign laboratories

- *Centro de Matemática da Universidade do Porto* (Portugal). November–December 2019. Collaboration with S.M.A. Gama on issues related to tracer and inertial particles.

- *Laboratoire Jean-Alexandre Dieudonné*, Nice (France). January 2019, February 2020, November 2021. Collaboration with D. Vincenzi on issues related to magnetohydrodynamics and polymers.

- *University of Helsinki* (Finland). August–September 2011. Collaboration with Dr. Paolo Muratore-Ginanneschi on issues related to diffusion of inertial particles.

- *Weizmann Institute of Science*, Rehovot (Israel). January 2006. Collaboration with Prof. Gregory Falkovich on issues related to passive-scalar turbulence.

- *Observatoire de la Côte d'Azur*, Nice (France). December 2004–April 2005. Collaboration with Prof. Uriel Frisch on issues related to the multifractal theory of turbulence.

- *Institut Non-Linéaire de Nice*, Valbonne-Sophia-Antipolis (France). February–May 2004. Collaboration with Dr. Antonio Celani on issues related to scalar turbulent transport.

Keywords of my research activity

- Passive-scalar turbulence, tracer statistics in Kraichnan model

- Coarse-grained description, large-eddy simulations

- Non-ideal turbulence: compressibility, anisotropy, inhomogeneity (point source)

- Polymers, FENE model

- Inertial particles: aerosols, droplets, bubbles

- Transport properties: settling velocity, eddy diffusivity

- Multiple-scale expansion, second-quantization algorithm

- Multifractal formalism, large-deviation theory

- Statistics of the velocity field, closure models for its gradient tensor

- Effect of turbulence on biological systems (microorganisms in bioreactors)

- Falling granular jets, mesoscopic approach, two-fluid model

- Red blood cells, biological membranes (capsules, vesicles)

- Electrostatic field in diphasic flows, turbulent magnetic dynamo (Kazantsev)

- Stability analysis and separation control on aerodynamic profiles

- 2D point vortices, nanofluids

- Compressor stall and surge, energy harvesting from sea waves

- Theoretical, nonlinear and statistical physics

- Fluid mechanics, Lagrangian and Eulerian dynamics

List of publications

International journals

[27] *Optimization of Thermal Transport of Nanofluids in a Wavy Irregular Enclosure under the Influence of Inclined Periodic MHD*
T. Islam, S. Gama and **M. Martins Afonso**
in press on *Numerical Heat Transfer, Part* A*: Applications* (2024).

[26] *ANN and RSM-Driven Optimization of Cu-Al$_2$O$_3$/Water Hybrid Nanofluid Flow in a Wavy Enclosure with Inclined Periodic MHD Effects*
T. Islam, S. Gama and **M. Martins Afonso**
Mathematics **13** (1), no. 78, pp. 1–44 (2024).

[25] *Tracking Point Vortices and Circulations via Advected Passive Particles: An Estimation Approach*
G. Marques, **M. Martins Afonso** and S. Gama
IEEE *Control Systems Letters* **7**, 1760–1765 (2023).

[24] *Kazantsev dynamo in turbulent compressible flows*
M. Martins Afonso, D. Mitra and D. Vincenzi
Proceedings of the Royal Society A **475** (2223), no. 20180591, pp. 1–17 (2019).

[23] *Optimal transient growth in an incompressible flow past a backward-slanted step*
M. Martins Afonso, P. Meliga and E. Serre
Fluids **4** (1), no. 33, pp. 1–16 (2019).

[22] *Point-source dispersion of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso and S.M.A. Gama
European Physical Journal E **42** (1), no. 10, pp. 1–8 (2019).

[21] *Eddy diffusivity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, P. Muratore-Ginanneschi, S.M.A. Gama and A. Mazzino
Physical Review Fluids **3** (4), no. 044501, pp. 1–21 (2018).

[20] *Settling velocity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso and S.M.A. Gama
Comptes Rendus Mécanique **346** (2), 121–131 (2017).

[19] *Combined role of molecular diffusion, mean streaming and helicity in the eddy diffusivity of short-correlated random flows*
M. Martins Afonso, A. Mazzino and S. Gama
Journal of Statistical Mechanics, 103205, pp. 1–17 (10\)(2016).

[18] *Anomalous diffusion of inertial particles in random parallel flows: theory and numerics face to face*
S. Boi, **M. Martins Afonso** and A. Mazzino
Journal of Statistical Mechanics, P10023, pp. 1–21 (10\)(2015).

[17] *Anomalous diffusion for inertial particles under gravity in parallel flows*
M. Martins Afonso
Physical Review E **89** (6), no. 063021, pp. 1–8 (2014).

[16] *On the damped oscillations of an elastic quasi-circular membrane in a two-dimensional incompressible fluid*
M. Martins Afonso, S. Mendez and F. Nicoud
Journal of Fluid Mechanics **746**, 300–331 (2014).

[15] *Stokes drift for inertial particles transported by water waves*
F. Santamaria, G. Boffetta, **M. Martins Afonso**, A. Mazzino, M. Onorato and D. Pugliese
Europhysics Letters **102** (1), no. 14003, pp. 1–5 (2013).

[14] *Numerical study of substrate assimilation by a microorganism exposed to fluctuating concentration*
M. Linkès, **M. Martins Afonso**, P. Fede, J. Morchain and P. Schmitz
Chemical Engineering Science **81**, 8–19 (2012).

[13] *Eddy diffusivities of inertial particles under gravity*
M. Martins Afonso, A. Mazzino and P. Muratore-Ginanneschi
Journal of Fluid Mechanics **694**, 426–463 (2012).

[12] *Point-source inertial particle dispersion*
M. Martins Afonso and A. Mazzino
Geophysical and Astrophysical Fluid Dynamics **105** (6), 553–565 (2011).

[11] *Recent Fluid Deformation closure for velocity gradient tensor dynamics in turbulence: time-scale effects and expansions*
M. Martins Afonso and C. Meneveau
Physica D **239**, 1241–1250 (2010).

[10] *Renormalized transport of inertial particles in surface flows*
M. Martins Afonso, A. Mazzino and P. Olla
Journal of Physics A **42** (27), no. 275502, pp. 1–18 (2009).

[9] *The terminal velocity of sedimenting particles in a flowing fluid*
M. Martins Afonso
Journal of Physics A **41** (38), no. 385501, pp. 1–15 (2008).

[8] *Fluid-particle separation in a random flow described by the telegraph model*
G. Falkovich and **M. Martins Afonso**
Physical Review E **76** (2), no. 026312, pp. 1–5 (2007).

[7] *Point-source scalar turbulence*
A. Celani, **M. Martins Afonso** and A. Mazzino
Journal of Fluid Mechanics **583**, 189–198 (2007).

[6] *Coarse-grained description of a passive scalar*
A. Celani, **M. Martins Afonso** and A. Mazzino
Journal of Turbulence **7**, no. 52, pp. 1–18 (2006).

[5] *Does multifractal theory of turbulence have logarithms in the scaling relations?*
U. Frisch, **M. Martins Afonso**, A. Mazzino and V. Yakhot
Journal of Fluid Mechanics **542**, 97–103 (2005).

[4] *Structure of temperature fluctuations in turbulent convective boundary layers*
M. Antonelli, **M. Martins Afonso**, A. Mazzino and U. Rizza
Journal of Turbulence **6**, no. 35, pp. 1–34 (2005).

[3] *Nonlinear elastic polymers in random flows*
M. Martins Afonso and D. Vincenzi
Journal of Fluid Mechanics **540**, 99–108 (2005).

[2] *Inhomogeneous anisotropic passive scalars*
M. Martins Afonso and M. Sbragaglia
Journal of Turbulence **6**, no. 10, pp. 1–13 (2005).

[1] *Large-eddy-simulation closures of passive scalar turbulence: a systematic approach*
M. Martins Afonso, A. Celani, R. Festa and A. Mazzino
Journal of Fluid Mechanics **496**, 355–364 (2003).

Conference proceedings

[IX] *Application of multidimensional Hermite polynomials to fluid mechanics*
M. Martins Afonso and S.M.A. Gama
In: *Proceedings of SymComp2019* (ECCOMAS), Porto (Portugal), April 11–12, 2019 (eds.: Maria Amélia Loja, Joaquim Infante Barbosa, José Alberto Rodrigues and Paulo B. Vasconcelos), pp. 337–342, APMTAC.

[VIII] *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
M. Martins Afonso, S.M.A. Gama and A. Mazzino
In: *Proceedings of the 9th Turbulence, Heat and Mass Transfer Conference* (ICHMT), Rio de Janeiro (Brazil), July 10–13, 2018 (eds.: A.P. Silva Freire, K. Hamjalić, K. Suga, D. Borello and M. Hadžiabdić), pp. 175–178 (printed) & 141–152 (online), Begell House, Danbury.

[VII] *Inertial-particle dispersion and diffusion*
M. Martins Afonso, A. Mazzino and P. Muratore-Ginanneschi
In: *Advances in Turbulence XIII*, Proceedings of the 13th EUROMECH European Turbulence Conference, Warsaw (Poland), September 12–15, 2011, *Journal of Physics: Conference Series*, vol. 318, no. 052014, pp. 1–4.

[VI] *Renormalized transport of inertial particles*
M. Martins Afonso, A. Celani, A. Mazzino and P. Olla
In: *Advances in Turbulence XII*, Proceedings of the 12th EUROMECH European Turbulence Conference, Marburg (Germany), September 7–10, 2009 (ed.: B. Eckhardt), Springer Proceedings in Physics, vol. 132, pp. 505–508, Springer, Heidelberg.

[V] *Settling velocity of inertial particles*
A. Celani, **M. Martins Afonso** and A. Mazzino
In: *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, Porto (Portugal), June 25–28, 2007 (eds.: J.M.L.M. Palma and A. Silva Lopes), Springer Proceedings in Physics, vol. 117, pp. 61–63, Springer, Heidelberg.

[IV] *Mixing of a passive scalar emitted from a random-in-time point source*
A. Celani, **M. Martins Afonso** and A. Mazzino
In: *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, Porto (Portugal), June 25–28, 2007 (eds.: J.M.L.M.

Palma and A. Silva Lopes), Springer Proceedings in Physics, vol. 117, pp. 206–208, Springer, Heidelberg.

[III] *Punctual emission of a passive scalar in turbulent flows*
A. Celani, **M. Martins Afonso** and A. Mazzino
To appear in a special issue of *Physics of Particles and Nuclei, Letters*, proceedings of the conference Mathematical Modeling and Computational Physics 2006, Tatranská Štrba (Slovakia), August 28–September 1, 2006.

[II] *Coarse-grained scalar transport: closures and large-eddy simulations*
A. Celani, **M. Martins Afonso** and A. Mazzino
In: *Progress in Turbulence II*, Proceedings of the iTi Conference on Turbulence, Bad Zwischenahn (Germany), September 25–28, 2005 (eds.: M. Oberlack, S. Guenther, T. Weller, G. Khujadze, A. Osman, M. Frewer and J. Peinke), Springer Proceedings in Physics, vol. 109, pp. 229–233, Springer, Heidelberg.

[I] *Closures for large-eddy simulations of passive scalars*
M. Martins Afonso, A. Celani and A. Mazzino
In: *Advances in Turbulence X*, Proceedings of the 10th European Turbulence Conference, Trondheim (Norway), June 29–July 2, 2004 (eds.: H.I. Andersson and P.A. Krogstad), pp. 319–322, CIMNE, Barcelona.

Book chapters

[00bis] *YALES2BIO : un solveur dédié aux écoulements sanguins*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic and F. Nicoud
Invited contribution in: *Écoulements biologiques dans les grands vaisseaux : dialogue entre modélisations numériques et études expérimentales in vitro/in vivo* (eds.: V. Deplano, J.-M. Fullana and C. Verdier), Sciences—Mécanique—Mécanique du vivant, ch. 7, pp. 185–208, ISTE, London (2023).

[00] *YALES2BIO: A General Purpose Solver Dedicated to Blood Flows*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic and F. Nicoud
Invited contribution in: *Biological Flow in Large Vessels: Dialog Between Numerical Modeling and In Vitro/In Vivo Experiments* (eds.: V. Deplano, J.-M. Fullana and C. Verdier), Sciences—Mechanics—Biomechanics, ch. 7, pp. 183–206, John Wiley & Sons, Hoboken, NJ (2022).

[0] *Flow-driven renormalization of transport and sedimentation for inertial particles*
M. Martins Afonso
Invited contribution in: *Mathematical Analysis and Applications in Engineering, Aerospace and Sciences* (ed.: S. Sivasundaram), Mathematical Problems in Engineering Aerospace and Sciences, vol. 5, no. 13, pp. 187–201, Cambridge Scientific Publishers, Cambridge (2012).

Survey articles

[∅] *Applications of mathematics in fluid dynamics*
M. Martins Afonso
Invited contribution in: CIM *Bulletin* **36**, 26–31 (March 2016).

Papers in online archives only

[ii] "Analyse théorique de stabilité linéaire d'un jet granulaire tombant" (*Theoretical analysis of linear stability for a falling granular jet*)
M. Martins Afonso
`HAL`: hal-00769571 (2013).

[i] *Fluid-particle separation in the Batchelor regime with telegraph model of noise*
M. Martins Afonso
`arXiv`: nlin.CD/0703056 (2007).

Editorials

- *Editorial for Special Issue "Multiscale Turbulent Transport"*
M. Martins Afonso and S.M.A. Gama
Fluids **4** (4), no. 185, pp. 1–2 (2019).

Books as editor and contributor

- *"Multiscale Turbulent Transport"*
M. Martins Afonso and S. Gama
10 chapters, 200 pages, MDPI (2020).
Personal contributions: editorial pp. 1–2, article pp. 11–26.

In preparation

- *Velocity scaling exponents in the refined Advected Delta-Vee model*
M. Martins Afonso.

- *On the electric-field modifications induced by flowing red blood cells in Coulter-like particle-counting devices*
M. Martins Afonso, S. Mendez and F. Nicoud.

Communications in books of abstracts only

- *Transport properties of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, S.M.A. Gama, A. Mazzino and P. Muratore-Ginanneschi
EUROMECH ETC17, no. 331, s2-r10 (2019).

- *An application of multivariate Hermite polynomials in fluid mechanics*
M. Martins Afonso
WNA2019, pp. 16–17 (2019).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  M. Martins Afonso
  WOPA2017, p. 16 (2017).

- *Effective diffusivity of short-correlated random flows*
  M. Martins Afonso, A. Mazzino and S. Gama
  EUROMECH ETC16, no. 28722, C7-5 (2017).

- *Eddy diffusivity of short-correlated random flows: effects of helicity, molecular diffusion and mean streaming*
  M. Martins Afonso
  Flowing Matter 2017, p. 39 (2017).

- *Renormalized transport and diffusion of tracer and inertial particles*
  M. Martins Afonso, A. Mazzino and S. Gama
  ENSPM2016, p. 214 (2016).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  M. Martins Afonso and A. Mazzino
  EUROMECH ETC15, no. 331, M-TM1-5 (2015).

- *Optimal transient growth in flow past a slanted surface*
  M. Martins Afonso, P. Meliga and E. Serre
  APS Bulletin, vol. 59, no. 20, p. 413, R21.0005 (2014).

- *Stokes drift for inertial particles transported by water waves*
  F. Santamaria, G. Boffetta, **M. Martins Afonso**, M. Onorato and A. Mazzino
  EUROMECH ETC14, no. 147, MD1-PT6-1 (2013).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  M. Martins Afonso, A. Mazzino and P. Muratore-Ginanneschi
  EUROMECH ETC14, no. 133, TD1-PT8-3 (2013).

- *Renormalized transport of inertial particles*
  M. Martins Afonso, A. Celani, A. Mazzino and P. Olla
  APS Bulletin, vol. 55, no. 16, p. 196, GV.00001 (2010).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  M. Martins Afonso, J. Morchain and P. Fede
  II FERMaT–IMPACT meeting, p. 10 (2009).

- *Terminal velocity of inertial particles*
  A. Celani, **M. Martins Afonso** and A. Mazzino
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 48, 51/III[6] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso and C. Meneveau
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 36, 37/IV[7] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso and C. Meneveau
  APS Bulletin, vol. 53, no. 2, p. 151, D9.00002 (2008).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  G. Falkovich and **M. Martins Afonso**
  XXIII IUPAP International Conference on Statistical Physics, p. 346, 5C-164 (2007).

Posters

- *Study of the dynamics of the velocity gradient tensor*
  "Symposium on Fluid Science and Turbulence", May 30–31, 2008, Johns Hopkins University, Baltimore, MD (USA).

- *First-principle closures for passive-scalar turbulence*
  INFM National Course on "Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi", September 13–17, 2004, ISI - Villa Gualino, Torino (Italy).

Oral presentations

- *Effective transport of inertial particles in fluid flows*
  "Applied Mathematics: Analysis, Numerics and Computing" Seminar (Faculdade de Engenharia da Universidade do Porto), July 14, 2023, Porto (Portugal).

- *Effective and anomalous diffusion of inertial particles in fluid flows*
  "Dynamical Systems" Seminar (Centro de Matemática da Universidade do Porto), March 6, 2020, Porto (Portugal).

- *Renormalized transport of inertial particles*
  "Applied Mathematics and Numerical Analysis" Seminar (Instituto Superior Técnico), October 16, 2019, Lisboa (Portugal).

- *Transport properties of quasi-neutrally-buoyant inertial particles*
  17th EUROMECH European Turbulence Conference, September 3–6, 2019, Torino (Italy).

- *An application of multivariate Hermite polynomials in fluid mechanics*
  Invited speaker: WNA2019 "Workshop on Numerical Analysis", July 15, 2019, Porto (Portugal).

- *Application of multidimensional Hermite polynomials to fluid mechanics*
  4th International Conference on Numerical and Symbolic Computation: Developments and Applications (SymComp2019), April 11–12, 2019, Porto (Portugal).

- *Effective transport of inertial particles in fluid flows*
  "Interfaces" Seminar (Laboratoire Jean-Alexandre Dieudonné), January 25, 2019, Nice (France).

- *Renormalized transport of inertial particles*
  "Systems and Control" Seminar (Centro de Investigação e Desenvolvimento em Matemática e Aplicações), November 21, 2018, Aveiro (Portugal).

- *Renormalized transport of inertial particles*
  "Fluid Dynamics" Seminar (Instituto de Matemática Pura e Aplicada), July 11, 2018, Rio de Janeiro (Brazil).

- *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
  9th Turbulence, Heat and Mass Transfer Conference, July 10–13, 2018, Rio de Janeiro (Brazil).

- *Renormalized transport of inertial particles*
  Seminar (Centro de Matemática e Aplicaçoẽs, Universidade da Beira Interior), May 9, 2018, Covilhã (Portugal).

- *Applications of mathematics in fluid dynamics*
  Post-Doc Meeting (Centro de Matemática da Universidade do Porto), April 27, 2018, Porto (Portugal).

- *Settling velocity and eddy diffusivity of quasi-neutrally-buoyant inertial particles*
  Flowing Matter (COST Action MP 1305), February 5–9, 2018, Lisboa (Portugal).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  Invited speaker: WOPA2017 "Workshop on Orthogonal Polynomials and Applications", September 5, 2017, Porto (Portugal).

- *Effective diffusivity of short-correlated random flows*
  16th EUROMECH European Turbulence Conference, August 21–24, 2017, Stockholm (Sweden).

- *Renormalized transport of inertial particles*
  "Numerical Analysis and Optimization" Seminar (Centro de Matemática da Universidade de Coimbra), March 22, 2017, Coimbra (Portugal).

- *Eddy diffusivity of short-correlated random flows*
  Flowing Matter (COST Action MP1305), January 23–27, 2017, Porto (Portugal).

- *Effective and anomalous diffusion of tracer and inertial particles in flowing fluids*
  "Dynamical Systems" Seminar (Centro de Matemática da Universidade do Porto), September 30, 2016, Porto (Portugal).

- *Renormalized transport and diffusion of tracer and inertial particles*
  "Encontro Nacional da Sociedade Portuguesa de Matemática", July 11–13, 2016, Barreiro (Portugal).

- *Renormalized transport of inertial particles*
  Post-Doc Meeting (Centro de Matemática da Universidade do Porto), December 18, 2015, Porto (Portugal).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  15th EUROMECH European Turbulence Conference, August 25–28, 2015, Delft (Netherlands).

- *Optimal transient growth in flow past a slanted surface*
  67th APS–DFD Meeting, November 23–25, 2014, San Francisco, CA (USA).

- *Effective transport of inertial particles*
  Seminar (Department of Physics, University of Roma II "Tor Vergata"), February 13, 2014, Roma (Italy).

- *Transport effectif de particules inertielles*
  Seminar (Institut de Recherche sur les Phénomènes Hors Équilibre, Aix-Marseille Université), November 21, 2013, Marseille (France).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  14th EUROMECH European Turbulence Conference, September 1–4, 2013, Lyon (France).

- *Inertial-particle dispersion and diffusion*
  Conference on Particles in Turbulence (COST Action), July 1–5, 2013, Eindhoven (Netherlands).

- *Transport effectif de particules inertielles*
  Seminar ITC (Laboratoire de Mécanique, Modélisation et Procédés Propres, École Centrale de Marseille & Institut Méditerranéen de Technologie), June 20, 2013, Marseille (France).

- *Méthodes numériques pour l'interaction fluide–structure : aspects physiques*
  Seminar SMOCS (I3M, UM2), December 18, 2012, Montpellier (France).

- *Inertial-particle dispersion and diffusion*
  Workshop on Particles in Turbulence (COST Action), May 14–16, 2012, Leiden (Netherlands).

- *Mise en pratique de la LBM : conditions limites et géométries complexes*
  Seminar GTCS (I3M, UM2), March 20, 2012, Montpellier (France).

- *Transport effectif de particules inertielles*
  Seminar ER1-FCI (Laboratoire de Mécanique de Lille, École Centrale de Lille), February 2, 2012, Lille (France).

- *L'équation de Boltzmann*
  Seminar ACSIOM (I3M, UM2), December 13, 2011, Montpellier (France).

- *Inertial-particle dispersion and diffusion*
  13th EUROMECH European Turbulence Conference, September 12–15, 2011, Warsaw (Poland).

- *Effective transport of inertial particles*
  Seminar LEPFM (Department of Energetics and Machines, University of Udine), July 14, 2011, Udine (Italy).

- *Renormalized transport of inertial particles*
  63rd APS–DFD Meeting, November 21–23, 2010, Long Beach, CA (USA).

- *Effective transport of inertial particles*
  Seminar DAH (Laboratoire de Mécanique des Fluides, École Centrale de Nantes), November 4, 2010, Nantes (France).

- *Renormalized transport of inertial particles*
  International School on Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds, September 2–10, 2010, Porquerolles (France).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  GDR Turbulence CNRS, May 31–June 2, 2010, Rouen (France).

- *Renormalized transport of inertial particles*
  Seminar PhyStat (Laboratoire de Physique Théorique, Université Paul Sabatier), February 9, 2010, Toulouse (France).

- *Renormalized transport of inertial particles*
  Workshop on Modeling — Particles in Turbulence (COST Action), December 2–4, 2009, Nice (France).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  2nd FERMaT–IMPACT Meeting, October 13–16, 2009, Twente University, Enschede (Netherlands).

- *Effective transport of inertial particles*
  Seminar GEP (Institut Universitaire des Systèmes Thermiques Industriels, Polytech'Marseille), October 9, 2009, Marseille (France).

- *Renormalized transport of inertial particles*
  Seminar FLUBIO (Department of Civil, Environmental and Architectural Engineering, University of Genova), September 14, 2009, Genova (Italy).

- *Trasporto efficace di particelle inerziali*
  Seminar (Department of Physics, University of Genova), September 11, 2009, Genova (Italy).

- *Renormalized transport of inertial particles*
  12th EUROMECH European Turbulence Conference, September 7–10, 2009, Marburg (Germany).

- *Renormalized transport of inertial particles*
  Seminar EEC (Institut de Mécanique des Fluides de Toulouse, Institut National Polytechnique de Toulouse), April 23, 2009, Toulouse (France).

- *Renormalized transport of inertial particles*
  Rencontres Niçoises de Mécanique des Fluides (Observatoire de la Côte d'Azur), January 26, 2009, Nice (France).

- *Trasporto rinormalizzato di particelle inerziali*
  Seminar (Department of Physics, University of Genova), January 23, 2009, Genova (Italy).

- *Exploring the dynamics of the velocity gradient tensor*
  Friday Thermo-Fluids Seminars (Department of Mechanical Engineering, Johns Hopkins University), October 3, 2008, Baltimore, MD (USA).

- *Terminal velocity of inertial particles*
  ICNPAA International Conference on "Mathematical Problems in Engineering, Aerospace and Sciences", June 25–27, 2008, Genova (Italy).

- *Exploring the dynamics of the velocity gradient tensor*
  ICNPAA International Conference on "Mathematical Problems in Engineering, Aerospace and Sciences", June 25–27, 2008, Genova (Italy).

- *Exploring the dynamics of the velocity gradient tensor*
  APS March Meeting, March 10–14, 2008, New Orleans, LA (USA).

- *On the terminal velocity of sedimenting particles in a flowing fluid*
  Seminar for the Chapman Fellowships interview (Department of Mathematics, Imperial College), February 20, 2008, London (UK).

- *Studio della dinamica del tensore gradiente e degli incrementi del campo di velocità*
  Seminar (Department of Physics, University of Genova), January 7, 2008, Genova (Italy).

- *Exploring the dynamics of velocity gradients and velocity increments*
  Friday Thermo-Fluids Seminars (Department of Mechanical Engineering, Johns Hopkins University), November 30, 2007, Baltimore, MD (USA).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  Seminar for the ITR Turbulence Meeting (Department of Physics, Johns Hopkins University), September 27, 2007, Baltimore, MD (USA).

- *Separazione fra particelle fluide nel modello a telegrafo*
  Seminar (Department of Physics, University of Genova), August 31, 2007, Genova (Italy).

- *Settling velocity of inertial particles*
  Seminar of the Fluid Dynamics group (Department of Physics of Complex Systems, Weizmann Institute of Science), August 16, 2007, Rehovot (Israel).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  StatPhys 23 Conference, July 9–13, 2007, Genova (Italy).

- *Mixing of a Passive Scalar Emitted from a Random-in-Time Point Source*
  11th EUROMECH European Turbulence Conference, June 25–28, 2007, Porto
  (Portugal).

- *Settling Velocity of Inertial Particles*
  11th EUROMECH European Turbulence Conference, June 25–28, 2007, Porto
  (Portugal).

- *Settling velocity of inertial particles*
  Seminar (Department of Aeronautics, Imperial College), May 16, 2007, London
  (UK).

- *Velocità di deposizione di particelle inerziali*
  Seminar (Department of Physics, University of Genova), December 22, 2006,
  Genova (Italy).

- *Inhomogeneous passive scalars: the point-source problem*
  Plenary speaker: Conference on "Mathematical Modeling and Computational
  Physics", August 28–September 1, 2006, Tatranská Štrba (Slovakia).

- *Inhomogeneous passive scalars: the point-source problem*
  Workshop on "Non-equilibrium statistical mechanics and turbulence", July 15–
  21, 2006, Warwick University, Coventry (UK).

- *Modelli analitici di turbolenza: lo scalare passivo*
  Seminar of the Ph.D. course (Department of Physics, University of Genova),
  May 18, 2006, Genova (Italy).

- *Inhomogeneous passive scalars: the point-source problem*
  Meeting of EU Networks "Fluid Mechanical Stirring and Mixing: the La-
  grangian Approach" and "Physics of Nonequilibrium and Complex Systems",
  February 12–17, 2006, Weizmann Institute of Science, Rehovot (Israel).

- *Coarse-grained scalar transport: closures and large-eddy simulations*
  ITI Conference on Turbulence, September 25–28, 2005, Bad Zwischenahn (Ger-
  many).

- *LES: un approccio matematico. Chiusure e filtri per lo scalare passivo*
  Seminar of the group of Atmospheric and Oceanic Physics (Department of
  Physics, University of Genova), September 23, 2005, Genova (Italy).

- *Inhomogeneous anisotropic passive scalars*
  Meeting of EU Network "Fluid Mechanical Stirring and Mixing: the Lagrangian
  Approach", June 10–11, 2005, Torino (Italy).

- *Disomogeneità e anisotropie dello scalare passivo*
  "Convegno annuale nazionale informale di Fisica Teorica" INFN, May 25–28,
  2005, Cortona, Arezzo (Italy).

- *Chiusure LES, disomogeneità, polimeri, grandi deviazioni e particelle inerziali*
  "Incontro annuale per il progetto PICS" (Universities of Genova, Nice and
  Torino), February 17–18, 2005, Acceglio, Cuneo (Italy).

- *First-principle closures for passive scalar turbulence*
  INLN Meeting on "Fluid Mechanical Stirring and Mixing: the Lagrangian Approach" and "Nonideal Turbulence", October 11–15, 2004, Nice (France).

- *An analytically solvable model of large-eddy simulation of passive scalar fields*
  INFM Workshop on "Lagrangian problems in turbulence", June 27–28, 2003, Roma (Italy).

Schools

- SoftFlow 2012: *Biological Complex Fluids*, June 26 – July 6, 2012, Cargèse (France).

- International School: *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds*, September 2–10, 2010, Porquerolles (France).

- LMS-EPSRC Short Course: *Non-equilibrium statistical mechanics and turbulence*, July 10–14, 2006, Warwick University, Coventry (UK).

- Winter School: *Minerva*, February 12–17, 2006, Weizmann Institute of Science, Rehovot (Israel).

- INFM National Course: *Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi*, September 13–17, 2004, ISI - Villa Gualino, Torino (Italy).

- CIMA Summer School: *Transport in Geophysical Flows: Ten Years After*, June 14–23, 2004, Saint Oyen, Aosta (Italy).

- Summer School: *Transport, reaction and propagation in fluids*, and Conference: *Kolmogorov's legacy in physics: one century of chaos, turbulence and complexity*, September 8–17, 2003, Abdus Salam International Center for Theoretical Physics, Trieste (Italy).

Referee activity

International journals:

- *Journal of Turbulence*

- *Journal of Mathematical Physics*

- *Physical Review* E

- IMA *Journal of Applied Mathematics*

- *Europhysics Letters*

- *Physical Review Letters*

- *Physica* D

- *Physics of Fluids*

- *Meccanica*

- *Symmetry*

- *Fluids*

- *Energies*

- *International Journal of Multiphase Flow*

- *Journal of Fluid Mechanics*

- *Physical Review Research*

- *Monthly Notices of the Royal Astronomical Society*

- *Journal of Nonlinear Science*

- *Physical Review Applied*

- *Sensors*

- *Mathematics*

- *Journal of Dermatology and Skin Science*

- *Minerals*

- *Processes*

- *Electronics*

- *Inventions*

- *Physchem*

- *Microfluidics and Nanofluidics*

- *Lubricants*

- *Fractal and Fractional*

- *Axioms*

- *Sustainability*

- *Algorithms*

- *Applied Sciences*

- *Journal of Marine Science and Engineering*

- *Photonics*

- *Water*

- *Computation*

- *AppliedMath*

- *Micromachines*

- *Information*

- *Magnetochemistry*

- *Contemporary Mathematics*

- *Machines*

Peer-reviewed conferences:

- 2020 European Control Conference

- 2024 63rd IEEE Conference on Decision and Control

Editorial activity

Guest Editor (with Sílvio Gama) of the special issue "Multiscale Turbulent Transport" of the journal *Fluids* published by MDPI (2018–2019), and of the homonym book (2020).

Financed projects: redaction and participation

- Project MAGIC ("Multi-Agent Control and Estimation for Multi-Horizon Goals Conciliation") financed by *Fundação para a Ciência e a Tecnologia* in 2017 in the framework *Projetos de Investigação Científica e Desenvolvimento Tecnológico* COMPETE 2020

- "Contributi per l'addestramento di ricercatori presso centri di ricerca di alta qualificazione all'estero" financed by *Università degli Studi di Genova* in 2004

Software

- ECDL: Microsoft Office and Windows

- Good knowledge of FORTRAN, LaTeX, Matlab, Mathematica, Maple, Gnuplot, Paraview, Gambit, Freefem++, Simcenter Testlab

- Notions of HTML, Assembler, DOS, Basic, Pascal, Lotus, C, R, Maxima, Octave, Python, Ansys Fluent

Working-group animation

Animator of two working groups (*Lattice-Boltzmann Method* and *Fluid–Structure Interaction*) between 2011 and 2013 at I3M - UM2

Scientific habilitations

- *Qualification aux fonctions de Maître de Conférences* (France)
- *Abilitazione Scientifica Nazionale per Professore Associato* (Italy)

Participation to Ph.D.-defence committees

Doutoramento of Teresa Daniela Batista de Jesus Grilo, DM-FCUP (December 21, 2018)

Thesis supervision

- Codirector of Gil Miguel Marques's and Tarikul Islam's Ph.D. activities (CMUP, 2022–)

Curriculum vitæ de Marco Martins Afonso

Janvier 2025

Données personnelles

Nom de famille, prénom :	Martins Afonso, Marco
Lieu et date de naissance :	Gênes (Ligurie) [Italie] {Europe}, le 21 septembre 1979
Nationalité :	italienne
Langues :	italien, anglais, français, portugais, génois, latin

Adresse professionnelle

Adresse :	SIT Technologies ; Università di Genova, DIME—MASET—TPG ; via Montallegro 1, 16145 Genova, Italie (Villa Cambiaso - padiglioni F.019 F.037)
Membre :	Centro de Matemática da Universidade do Porto (CMUP) ; Departamento de Matemática da Faculdade de Ciências (FCUP) ; Rua do Campo Alegre, 687 ; 4169-007 Porto ; Portugal
Téléphone :	+39 0103532463 \ 0103532376
Internet :	http://marcomartinsafonso.epizy.com
E-mail :	marcomartinsafonso@yahoo.com

Formation et expérience scientifique

2024 –	DIME-MASET-TPG, Université de Gênes (Italie) : bourse de recherche.
2024	SIT Technologies, Université de Gênes (Italie) : consultant occasionnel.
2022 – 2023	Centro de Matemática da Universidade do Porto (Portugal) : contrat de recherche.
2015 – 2020	Centro de Matemática da Universidade do Porto (Portugal) : post-doc dans le groupe de Sílvio Marques de Almeida Gama.
2013 – 2014	Laboratoire de Mécanique Modélisation et Procédés Propres (Marseille), équipe Instabilité Turbulence et Contrôle : post-doc dans le groupe d'Eric Serre.
2011 – 2013	Institut de Mathématiques et de Modélisation de Montpellier, équipe Analyse Calcul Scientifique Industriel et Optimisation de Montpellier : post-doc dans le groupe de Franck Nicoud.
2009 – 2011	Institut de Mécanique des Fluides de Toulouse, équipe Particules Spray et Combustion : post-doc dans le groupe d'Olivier Simonin.
2007 – 2008	Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD (Etats-Unis) : post-doc dans le groupe de Charles Meneveau.
2006 – 2007	Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israël) : post-doc dans le groupe de Gregory Falkovich.
2003 – 2006	Département de Physique, Université de Gênes (Italie) : doctorat sous la direction de Roberto Festa et Andrea Mazzino. Titre de la thèse : *Analytical models of turbulence: from large scales to small scales, and beyond.*
1997 – 2002	Département de Physique, Université de Gênes (Italie) : *laurea* sous la direction de Roberto Festa et Andrea Mazzino ; note 110/110 *cum laude*. Titre de la

thèse : *Un modello risolubile analiticamente di large-eddy simulation di campi scalari passivi.*

Séjours à l'étranger et écoles

Novembre–Décembre 2019	Centro de Matemática da Universidade do Porto (Portugal) : collaboration avec S.M.A. Gama sur particules inertielles et traceurs.
Janvier 2019, Février 2020, Novembre 2021	Laboratoire Jean-Alexandre Dieudonné, Nice : collaboration avec Dario Vincenzi sur la magnéto–hydrodynamique et les polymères.
Juin–Juillet 2012	IESC - Cargèse : SoftFlow 2012 *Biological Complex Fluids.*
Août–Septembre 2011	University of Helsinki (Finlande) : collaboration avec Paolo Muratore-Ginanneschi sur la diffusion de particules inertielles.
Septembre 2010	IGESA - Porquerolles : école internationale *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds.*
Juillet 2006	Warwick University, Coventry (Royaume-Uni) : cours LMS–EPSRC *Non-equilibrium statistical mechanics and turbulence.*
Février 2006	Weizmann Institute of Science, Rehovot (Israël) : école d'hiver *Minerva.*
Janvier 2006	Weizmann Institute of Science, Rehovot (Israël) : collaboration avec Gregory Falkovich sur la turbulence du champ scalaire passif.
Décembre 2004–Avril 2005	Observatoire de la Côte d'Azur, Nice : collaboration avec Uriel Frisch sur la théorie multifractale de la turbulence.
Septembre 2004	ISI - Villa Gualino, Torino (Italie) : cours national INFM *Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi.*
Juin 2004	Saint Oyen, Aosta (Italie) : école d'été CIMA *Transport in Geophysical Flows: Ten Years After.*
Février–Mai 2004	Institut Non-Linéaire de Nice : collaboration avec Antonio Celani sur le transport turbulent.
Septembre 2003	Abdus Salam International Center for Theoretical Physics, Trieste (Italie) : école d'été *Transport, reaction and propagation in fluids.*

Rapporteur pour les journaux scientifiques (43+2)

- *Journal of Turbulence, Journal of Mathematical Physics, Physical Review* E, IMA *Journal of Applied Mathematics, Europhysics Letters, Physical Review Letters, Physica* D, *Physics of Fluids, Meccanica, Symmetry, Fluids, Energies, International Journal of Multiphase Flow, Journal of Fluid Mechanics, Physical Review Research, Monthly Notices of the Royal Astronomical Society, Journal of Nonlinear Science, Physical Review Applied, Sensors, Mathematics, Journal of Dermatology and Skin Science, Minerals, Processes, Electronics, Inventions, Physchem, Microfluidics and Nanofluidics, Lubricants, Fractal and Fractional,*

Axioms, Sustainability, Algorithms, Applied Sciences, Journal of Marine Science and Engineering, Photonics, Water, Computation, AppliedMath, Micromachines, Information, Magnetochemistry, Contemporary Mathematics, Machines

- Conférences internationales : 2020 European Control Conference & 2024 63rd IEEE Conference on Decision and Control

Activité éditoriale

Editeur invité (avec Sílvio Gama) du numéro spécial "Multiscale Turbulent Transport" du journal *Fluids* publié par MDPI (2018–2019) et du livre homonyme (2020)

Projets financés : redaction et participation

- Projet MAGIC ("Multi-Agent Control and Estimation for Multi-Horizon Goals Conciliation") financé par *Fundação para a Ciência e a Tecnologia* en 2017 dans le cadre *Projetos de Investigação Científica e Desenvolvimento Tecnológico* COMPETE 2020

- "Contributi per l'addestramento di ricercatori presso centri di ricerca di alta qualificazione all'estero" attribués par l'*Università degli Studi di Genova* en 2004

Liste des publications

Journaux internationaux

[27] *Optimization of Thermal Transport of Nanofluids in a Wavy Irregular Enclosure under the Influence of Inclined Periodic MHD*
T. Islam, S. Gama et **M. Martins Afonso**
sous presse en *Numerical Heat Transfer, Part* A*: Applications* (2024).

[26] *ANN and RSM-Driven Optimization of Cu-Al$_2$O$_3$/Water Hybrid Nanofluid Flow in a Wavy Enclosure with Inclined Periodic MHD Effects*
T. Islam, S. Gama et **M. Martins Afonso**
Mathematics **13**, 78 (2024).

[25] *Tracking Point Vortices and Circulations via Advected Passive Particles: An Estimation Approach*
G. Marques, **M. Martins Afonso** et S. Gama
IEEE *Control Systems Letters* **7**, 1760 (2023).

[24] *Kazantsev dynamo in turbulent compressible flows*
M. Martins Afonso, D. Mitra et D. Vincenzi
Proceedings of the Royal Society A **475**, 20180591 (2019).

[23] *Optimal transient growth in an incompressible flow past a backward-slanted step*
M. Martins Afonso, P. Meliga et E. Serre
Fluids **4**, 33 (2019).

[22] *Point-source dispersion of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso et S.M.A. Gama
European Physical Journal E **42**, 10 (2019).

[21] *Eddy diffusivity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, P. Muratore-Ginanneschi, S.M.A. Gama et A. Mazzino
Physical Review Fluids **3**, 044501 (2018).

[20] *Settling velocity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso et S.M.A. Gama
Comptes Rendus Mécanique **346**, 121 (2017).

[19] *Combined role of molecular diffusion, mean streaming and helicity in the eddy diffusivity of short-correlated random flows*
M. Martins Afonso, A. Mazzino et S. Gama
Journal of Statistical Mechanics, 103205 (**2016**).

[18] *Anomalous diffusion of inertial particles in random parallel flows: theory and numerics face to face*
S. Boi, **M. Martins Afonso** et A. Mazzino
Journal of Statistical Mechanics, P10023 (**2015**).

[17] *Anomalous diffusion for inertial particles under gravity in parallel flows*
M. Martins Afonso
Physical Review E **89**, 063021 (2014).

[16] *On the damped oscillations of an elastic quasi-circular membrane in a two-dimensional incompressible fluid*
M. Martins Afonso, S. Mendez et F. Nicoud
Journal of Fluid Mechanics **746**, 300 (2014).

[15] *Stokes drift for inertial particles transported by water waves*
F. Santamaria, G. Boffetta, **M. Martins Afonso**, A. Mazzino, M. Onorato et D. Pugliese
Europhysics Letters **102**, 14003 (2013).

[14] *Numerical study of substrate assimilation by a microorganism exposed to fluctuating concentration*
M. Linkès, **M. Martins Afonso**, P. Fede, J. Morchain et P. Schmitz
Chemical Engineering Science **81**, 8 (2012).

[13] *Eddy diffusivities of inertial particles under gravity*
M. Martins Afonso, A. Mazzino et P. Muratore-Ginanneschi
Journal of Fluid Mechanics **694**, 426 (2012).

[12] *Point-source inertial particle dispersion*
M. Martins Afonso et A. Mazzino
Geophysical and Astrophysical Fluid Dynamics **105**, 553 (2011).

[11] *Recent Fluid Deformation closure for velocity gradient tensor dynamics in turbulence: time-scale effects and expansions*
M. Martins Afonso et C. Meneveau
Physica D **239**, 1241 (2010).

[10] *Renormalized transport of inertial particles in surface flows*
M. Martins Afonso, A. Mazzino et P. Olla
Journal of Physics A **42**, 275502 (2009).

[9] *The terminal velocity of sedimenting particles in a flowing fluid*
M. Martins Afonso
Journal of Physics A **41**, 385501 (2008).

[8] *Fluid-particle separation in a random flow described by the telegraph model*
G. Falkovich et **M. Martins Afonso**
Physical Review E **76**, 026312 (2007).

[7] *Point-source scalar turbulence*
A. Celani, **M. Martins Afonso** et A. Mazzino
Journal of Fluid Mechanics **583**, 189 (2007).

[6] *Coarse-grained description of a passive scalar*
A. Celani, **M. Martins Afonso** et A. Mazzino
Journal of Turbulence **7**, 52 (2006).

[5] *Does multifractal theory of turbulence have logarithms in the scaling relations?*
U. Frisch, **M. Martins Afonso**, A. Mazzino et V. Yakhot
Journal of Fluid Mechanics **542**, 97 (2005).

[4] *Structure of temperature fluctuations in turbulent convective boundary layers*
M. Antonelli, **M. Martins Afonso**, A. Mazzino et U. Rizza
Journal of Turbulence **6**, 35 (2005).

[3] *Nonlinear elastic polymers in random flows*
M. Martins Afonso et D. Vincenzi
Journal of Fluid Mechanics **540**, 99 (2005).

[2] *Inhomogeneous anisotropic passive scalars*
M. Martins Afonso et M. Sbragaglia
Journal of Turbulence **6**, 10 (2005).

[1] *Large-eddy-simulation closures of passive scalar turbulence: a systematic approach*
M. Martins Afonso, A. Celani, R. Festa et A. Mazzino
Journal of Fluid Mechanics **496**, 355 (2003).

Comptes rendus de conférences

[IX] *Application of multidimensional Hermite polynomials to fluid mechanics*
M. Martins Afonso et S.M.A. Gama
Dans : *Proceedings of SymComp2019* (ECCOMAS), 11–12 avril 2019, Porto (Portugal) ;
éditeurs : Maria Amélia Loja, Joaquim Infante Barbosa, José Alberto Rodrigues et Paulo
B. Vasconcelos ; p. 337, APMTAC.

[VIII] *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
M. Martins Afonso, S.M.A. Gama et A. Mazzino
Dans : *Proceedings of the 9th Turbulence, Heat and Mass Transfer Conference* (ICHMT),
10–13 juillet 2018, Rio de Janeiro (Brésil) ; éditeurs : A.P. Silva Freire, K. Hamjalić,
K. Suga, D. Borello et M. Hadžiabdić ; p. 175 (imprimé) & 141 (en ligne), Begell House.

[VII] *Inertial-particle dispersion and diffusion*
M. Martins Afonso, A. Mazzino et P. Muratore-Ginanneschi
Dans : *Advances in Turbulence XIII*, Proceedings of the 13th EUROMECH European Turbulence Conference, 12–15 septembre 2011, Varsovie (Pologne) ; *Journal of Physics: Conference Series* **318**, n. 052014.

[VI] *Renormalized transport of inertial particles*
M. Martins Afonso, A. Celani, A. Mazzino et P. Olla
Dans : *Advances in Turbulence XII*, Proceedings of the 12th EUROMECH European Turbulence Conference, 7–10 septembre 2009, Marburg (Allemagne) ; éditeur : B. Eckhardt ; Springer Proceedings in Physics **132**, 505, Springer.

[V] *Settling velocity of inertial particles*
A. Celani, **M. Martins Afonso** et A. Mazzino
Dans : *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, 25–28 juin 2007, Porto (Portugal) ; éditeurs : J.M.L.M. Palma et A. Silva Lopes ; Springer Proceedings in Physics **117**, 61, Springer.

[IV] *Mixing of a passive scalar emitted from a random-in-time point source*
A. Celani, **M. Martins Afonso** et A. Mazzino
Dans : *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, 25–28 juin 2007, Porto (Portugal) ; éditeurs : J.M.L.M. Palma et A. Silva Lopes ; Springer Proceedings in Physics **117**, 206, Springer.

[III] *Punctual emission of a passive scalar in turbulent flows*
A. Celani, **M. Martins Afonso** et A. Mazzino
Sous presse dans une édition spéciale de *Physics of Particles and Nuclei, Letters* pour les : Proceedings of the conference Mathematical Modeling and Computational Physics 2006, 28 août–1 septembre 2006, Tatranská Štrba (Slovaquie).

[II] *Coarse-grained scalar transport: closures and large-eddy simulations*
A. Celani, **M. Martins Afonso** et A. Mazzino
Dans : *Progress in Turbulence II*, Proceedings of the iTi Conference on Turbulence, 25–28 septembre 2005, Bad Zwischenahn (Allemagne) ; éditeurs : M. Oberlack, S. Guenther, T. Weller, G. Khujadze, A. Osman, M. Frewer et J. Peinke ; Springer Proceedings in Physics **109**, 229, Springer.

[I] *Closures for large-eddy simulations of passive scalars*
M. Martins Afonso, A. Celani et A. Mazzino
Dans : *Advances in Turbulence X*, Proceedings of the 10th European Turbulence Conference, 29 juin–2 juillet 2004, Trondheim (Norvège) ; éditeurs : H.I. Andersson et P.A. Krogstad ; p. 319, CIMNE.

Chapitres de livres

[00bis] *YALES2BIO : un solveur dédié aux écoulements sanguins*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic et F. Nicoud

Contribution invitée dans : *Écoulements biologiques dans les grands vaisseaux : dialogue entre modélisations numériques et études expérimentales in vitro/in vivo* ; éditeurs : V. Deplano, J.-M. Fullana et C. Verdier ; Sciences—Mécanique—Mécanique du vivant, ch. 7, p. 185–208, ISTE (2023).

[00] *YALES2BIO: A General Purpose Solver Dedicated to Blood Flows*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic et F. Nicoud
Contribution invitée dans : *Biological Flow in Large Vessels: Dialog Between Numerical Modeling and In Vitro/In Vivo Experiments* ; éditeurs : V. Deplano, J.-M. Fullana et C. Verdier ; Sciences—Mechanics—Biomechanics, ch. 7, p. 183–206, John Wiley & Sons (2022).

[0] *Flow-driven renormalization of transport and sedimentation for inertial particles*
M. Martins Afonso
Contribution invitée dans : *Mathematical Analysis and Applications in Engineering Aerospace and Sciences* ; éditeur : S. Sivasundaram ; Mathematical Problems in Engineering Aerospace and Sciences **5**, n. 13, p. 187–201, Cambridge Scientific Publishers (2012).

Articles de revue

[∅] *Applications of mathematics in fluid dynamics*
M. Martins Afonso
Contribution invitée dans : CIM *Bulletin* **36**, 26–31 (Mars 2016).

Archives en ligne

[ii] *Analyse théorique de stabilité linéaire d'un jet granulaire tombant*
M. Martins Afonso
`HAL:` hal-00769571 (2013)

[i] *Fluid-particle separation in the Batchelor regime with telegraph model of noise*
M. Martins Afonso
`arXiv:` nlin.CD/0703056 (2007)

Editoriaux

- *Editorial for Special Issue "Multiscale Turbulent Transport"*
  M. Martins Afonso et S.M.A. Gama
  Fluids **4**, 185 (2019).

Livres : édition et contribution

- Multiscale Turbulent Transport
  M. Martins Afonso et S. Gama
  10 chapitres, 200 pages, MDPI (2020).
  Contributions personnelles : éditorial p. 1, article p. 11.

Papiers en préparation

- *Velocity scaling exponents in the refined advected delta-vee model*
  M. Martins Afonso

- *On the electric-field modifications induced by flowing red blood cells in Coulter-like particle-counting devices*
  M. Martins Afonso, S. Mendez et F. Nicoud

Communications en livres de résumés

- *Transport properties of quasi-neutrally-buoyant inertial particles*
  M. Martins Afonso, S.M.A. Gama, A. Mazzino et P. Muratore-Ginanneschi
  EUROMECH ETC17, no. 331, s2-r10 (2019).

- *An application of multivariate Hermite polynomials in fluid mechanics*
  M. Martins Afonso
  WNA2019, pp. 16–17 (2019).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  M. Martins Afonso
  WOPA2017, p. 16 (2017).

- *Effective diffusivity of short-correlated random flows*
  M. Martins Afonso, A. Mazzino et S. Gama
  EUROMECH ETC16, n. 28722, C7-5 (2017).

- *Eddy diffusivity of short-correlated random flows: effects of helicity, molecular diffusion and mean streaming*
  M. Martins Afonso
  Flowing Matter 2017, p. 39 (2017).

- *Renormalized transport and diffusion of tracer and inertial particles*
  M. Martins Afonso, A. Mazzino et S. Gama
  ENSPM2016, p. 214 (2016).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  M. Martins Afonso et A. Mazzino
  EUROMECH ETC15, n. 331, M-TM1-5 (2015).

- *Optimal transient growth in the flow past a backward-facing step*
  M. Martins Afonso, P. Meliga et E. Serre
  APS Bulletin, v. 59, n. 20, p. 413, R21.0005 (2014).

- *Stokes drift for inertial particles transported by water waves*
  F. Santamaria, G. Boffetta, **M. Martins Afonso**, M. Onorato et A. Mazzino
  EUROMECH ETC14, n. 147, MD1-PT6-1 (2013).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  M. Martins Afonso, A. Mazzino et P. Muratore-Ginanneschi
  EUROMECH ETC14, n. 133, TD1-PT8-3 (2013).

- *Renormalized transport of inertial particles*
  M. Martins Afonso, A. Celani, A. Mazzino et P. Olla
  APS Bulletin, v. 55, n. 16, p. 196, GV.00001 (2010).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  M. Martins Afonso, J. Morchain et P. Fede
  II FERMaT–IMPACT meeting, p. 10 (2009).

- *Terminal velocity of inertial particles*
  A. Celani, **M. Martins Afonso** et A. Mazzino
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 48, 51/III[6] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso et C. Meneveau
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 36, 37/IV[7] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso et C. Meneveau
  APS Bulletin, v. 53, n. 2, p. 151, D9.00002 (2008).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  G. Falkovich et **M. Martins Afonso**
  XXIII IUPAP International Conference, p. 346, 5C-164 (2007).

Posters

- *Study of the dynamics of the velocity gradient tensor*
  Pour le symposium *Fluid Science and Turbulence*, 30–31 mai 2008, Johns Hopkins University, Baltimore, MD (Etats-Unis).

- *First-principle closures for passive-scalar turbulence*
  Pour le cours national INFM *Non-equilibrium systems: the problem of turbulence in fluids and plasmas*, 13–17 septembre 2004, ISI - Villa Gualino, Torino (Italie).

Présentations orales

Conférences internationales (33)

- 17th EUROMECH *European Turbulence Conference*, 3–6 septembre 2019, Torino (Italie).

- *Orateur invité* :
  WNA2019 *Workshop on Numerical Analysis*, 15 juillet 2019, Porto (Portugal).

- 4th *International Conference on Numerical and Symbolic Computation: Developments and Applications*, 11–12 avril 2019, Porto (Portugal).

- 9th *Turbulence, Heat and Mass Transfer Conference*, 10–13 juillet 2018, Rio de Janeiro (Brésil).

- *Flowing Matter* (COST *Action*), 5–9 février 2018, Lisboa (Portugal).

- *Orateur invité* :
WOPA2017 *Workshop on Orthogonal Polynomials and Applications*, 5 septembre 2017, Porto (Portugal).

- 16th EUROMECH *European Turbulence Conference*, 21–24 août 2017, Stockholm (Suède).

- *Flowing Matter* (COST *Action*), 23–27 janvier 2017, Porto (Portugal).

- 15th EUROMECH *European Turbulence Conference*, 25–28 août 2015, Delft (Pays-Bas).

- 67th APS–DFD *Meeting*, 23–25 novembre 2014, San Francisco, CA (Etats-Unis).

- 14th EUROMECH *European Turbulence Conference*, 1–4 septembre 2013, Lyon.

- *Conference on Particles in Turbulence* COST *Action*, 1–5 juillet 2013, Eindhoven (Pays-Bas).

- *Workshop on Particles in Turbulence* COST *Action*, 14–16 mai 2012, Leiden (Pays-Bas).

- 13th EUROMECH *European Turbulence Conference*, 12–15 septembre 2011, Warszawa (Pologne).

- 63rd APS–DFD *Meeting*, 21–23 novembre 2010, Long Beach, CA (Etats-Unis).

- Ecole internationale *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds*, 2–10 septembre 2010, Porquerolles.

- *Workshop on Modeling — Particles in Turbulence* COST *Action*, 2–4 décembre 2009, Nice.

- 2nd FERMaT–IMPACT *Meeting*, 13–16 octobre 2009, Enschede (Pays-Bas).

- 12th EUROMECH *European Turbulence Conference*, 7–10 septembre 2009, Marburg (Allemagne).

- Conférence ICNPAA *Mathematical Problems in Engineering, Aerospace and Sciences* (2 présentations), 25–27 juin 2008, Genova (Italie).

- APS *March Meeting*, 10–14 mars 2008, New Orleans, LA (Etats-Unis).

- Conférence *StatPhys 23*, 9–13 juillet 2007, Genova (Italie).

- 11th EUROMECH *European Turbulence Conference* (2 présentations), 25–28 juin 2007, Porto (Portugal).

- *Orateur plénier* :
Conférence *Mathematical Modeling and Computational Physics*, 28 août–1 septembre 2006, Tatranská Štrba (Slovaquie).

- Symposium *Non-equilibrium statistical mechanics and turbulence*, 15–21 juillet 2006, Coventry (Royaume-Uni).

- Symposium des réseaux UE *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach* et *Physics of Nonequilibrium and Complex Systems*, 12–17 février 2006, Rehovot (Israël).

- ITI *Conference on Turbulence*, 25–28 septembre 2005, Bad Zwischenahn (Allemagne).

- Symposium du réseau UE *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach*, 10–11 juin 2005, Torino (Italie).

- Rencontre annuelle pour le projet PICS des Universités de Genova, Nice et Torino, 17–18 février 2005, Acceglio, Cuneo (Italie).

- Symposium des réseaux UE *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach* et *Nonideal Turbulence*, 11–15 octobre 2004, Nice.

- Symposium *Lagrangian problems in turbulence*, 27–28 juin 2003, Roma (Italie).

Conférences nationales (3)

- *Encontro Nacional da Sociedade Portuguesa de Matemática*, 11–13 juillet 2016, Barreiro (Portugal).

- GDR *Turbulence* CNRS, 31 mai–2 juin 2010, Rouen.

- *Convegno annuale nazionale informale di Fisica Teorica* INFN, 25–28 mai 2005, Cortona, Arezzo (Italie).

Séminaires invités (38)

- *Séminaire "Mathématiques Appliquées : Analyse, Numérique et Calcul"*, 14 juillet 2023, Faculdade de Engenharia da Universidade do Porto (Portugal).

- *Séminaire "Systèmes Dynamiques"*, 6 mars 2020, Centro de Matemática da Universidade do Porto (Portugal).

- *Séminaire "Mathématiques Appliquées et Analyse Numérique"*, 16 Octobre 2019, Instituto Superior Técnico, Lisboa (Portugal).

- *Séminaire "Interfaces"*, 25 janvier 2019, Laboratoire Jean-Alexandre Dieudonné, Nice.

- *Séminaire "Systèmes et Contrôle"*, 21 novembre 2018, Centro de Investigação e Desenvolvimento em Matemática e Aplicações, Aveiro (Portugal).

- *Séminaire "Dynamique des Fluides"*, 11 juillet 2018, Instituto de Matemática Pura e Aplicada, Rio de Janeiro (Brésil).

- *Séminaire*, 9 mai 2018, Centro de Matemática e Aplicaçoẽs, Universidade da Beira Interior, Covilhã (Portugal).

- *Rencontre Post-Doc*, 27 avril 2018, Centro de Matemática da Universidade do Porto (Portugal).

- *Séminaire "Analyse Numerique et Optimization"*, 22 mars 2017, Centro de Matemática da Universidade de Coimbra (Portugal).

- *Séminaire "Systèmes Dynamiques"*, 30 septembre 2016, Centro de Matemática da Universidade do Porto (Portugal).

- *Rencontre Post-Doc*, 18 décembre 2015, Centro de Matemática da Universidade do Porto (Portugal).

- *Séminaire*, 13 février 2014, Dipartimento di Fisica, Università di Roma II "Tor Vergata" (Italie).

- *Séminaire*, 21 novembre 2013, Institut de Recherche sur les Phénomènes Hors Equilibre, Aix-Marseille Université, Marseille.

- *Séminaire* ITC, 20 juin 2013, Laboratoire de Mécanique, Modélisation et Procédés Propres, Ecole Centrale de Marseille & Institut Méditerranéen de Technologie, Marseille.

- *Séminaire* SMOCS, 18 décembre 2012, Institut de Mathématiques et de Modélisation de Montpellier, Université Montpellier 2.

- *Séminaire* GTCS, 20 mars 2012, Institut de Mathématiques et de Modélisation de Montpellier, Université Montpellier 2.

- *Séminaire* ER1-FCI, 2 février 2012, Laboratoire de Mécanique de Lille, Ecole Centrale de Lille.

- *Séminaire* ACSIOM, 13 décembre 2011, Institut de Mathématiques et de Modélisation de Montpellier, Université Montpellier 2.

- *Séminaire* LEPFM, 14 juillet 2011, Dipartimento di Energetica e Macchine, Università di Udine (Italie).

- *Séminaire* DAH, 4 novembre 2010, Laboratoire de Mécanique des Fluides, Ecole Centrale de Nantes.

- *Séminaire PhyStat*, 9 février 2010, Laboratoire de Physique Théorique, Université Paul Sabatier, Toulouse.

- *Séminaire* GEP, 9 octobre 2009, Institut Universitaire des Systèmes Thermiques Industriels, Polytech'Marseille.

- *Séminaire* FLUBIO, 14 septembre 2009, Dipartimento di Ingegneria delle Costruzioni, dell'Ambiente e del Territorio, Università di Genova (Italie).

- *Séminaire* EEC, 23 avril 2009, Institut de Mécanique des Fluides de Toulouse, Institut National Polytechnique de Toulouse.

- *Rencontres Niçoises de Mécanique des Fluides*, 26 janvier 2009, Observatoire de la Côte d'Azur, Nice.

- *Thermo-Fluids group*, 3 octobre 2008 & 30 novembre 2007, Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD (Etats-Unis).

- *Chapman Fellowships interview*, 20 février 2008, Department of Mathematics, Imperial College, London (Royaume-Uni).

- *Gruppo di Fisica dell'Atmosfera e dell'Oceano*, 11 septembre 2009 & 23 janvier 2009 & 7 janvier 2008 & 31 août 2007 & 22 décembre 2006 & 23 septembre 2005, Dipartimento di Fisica, Università di Genova (Italie).

- ITR *Turbulence group*, 27 septembre 2007, Department of Physics, Johns Hopkins University, Baltimore, MD (Etats-Unis).

- *Fluid Dynamics group*, 16 août 2007, Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israël).

- *Fluid Mechanics group*, 16 mai 2007, Department of Aeronautics, Imperial College, London (Royaume-Uni).

- *Corso di Dottorato*, 18 mai 2006, Dipartimento di Fisica, Università di Genova (Italie).

Mots clés de ma recherche

Mécanique des fluides ; turbulence idéale et non-idéale (compressibilité, anisotropie et inhomogénéité : source ponctuelle) ; dynamique lagrangienne et eulérienne ; physique théorique, non-linéaire et statistique ; simulation des grandes échelles ; modèles de fermeture pour le gradient de vitesse ; méthodes multi-échelles et Boltzmann sur réseau ; interaction fluide–structure ; formalisme multifractal ; dispersion et mélange d'un traceur ou polluant ; champ électrostatique en écoulements diphasiques, magnéto–hydrodynamique (effet dynamo) ; couplage avec les systèmes biologiques ; écoulements complexes : solutions de polymères, suspensions de particules inertielles (aérosols, gouttes, bulles), jets granulaires tombants ; propriétés de transport : vitesse de sédimentation, diffusivité efficace ; approche mésoscopique, modèle à deux fluides ; globules rouges et membranes (capsules, vésicules) ; analyse de stabilité et contrôle du décollement sur profils aérodynamiques ; tourbillons ponctuels bidimensionnels, nanofluides ; décrochage et pompage de compresseurs, recuperation d'énergie des vagues marines

Logiciels

- ECDL : Microsoft Office et Windows

- Bonne connaissance de FORTRAN, LaTeX, Matlab, Mathematica, Maple, Gnuplot, Paraview, Gambit, Freefem++, Simcenter Testlab

- Notions de HTML, Assembler, DOS, Basic, Pascal, Lotus, C, R, Maxima, Octave, Python, Ansys Fluent

Animation de groupes de travail

Animateur de deux groupes de travail (*Lattice-Boltzmann Method* et *Fluid–Structure Interaction*) entre 2011 et 2013 chez I3M - UM2

Habilitations scientifiques

- *Qualification aux fonctions de Maître de Conférences*

- *Abilitazione Scientifica Nazionale per Professore Associato* (Italie)

Participation en jurys de thèse

Doutoramento de Teresa Daniela Batista de Jesus Grilo, DM-FCUP (21 décembre 2018)

Supervision de thèses

- Codirecteur des Doctorats de Gil Miguel Marques et de Tarikul Islam (CMUP, 2022–)

Curriculum Vitæ de Marco MARTINS AFONSO
Janeiro 2025

Dados pessoais

Nome :	Marco
Sobrenome\Apelido :	Martins Afonso
Nascimento :	Génova\Gênova (Ligúria) [Itália] {Europa}, 21 de Setembro 1979
Nacionalidade :	Italiana

Instituição Académica

Endereço :	SIT Technologies; Università di Genova, DIME-MASET-TPG; via Montallegro 1, 16145 Genova, Italy (Villa Cambiaso - padiglioni F.019 F.037)
Membro :	CMUP - Centro de Matemática da Universidade do Porto; Departamento de Matemática da Faculdade de Ciências, FCUP; Rua do Campo Alegre, 687; 4169-007 Porto; Portugal
Telefone :	+39 0103532463 \ 0103532376
Internet :	http://marcomartinsafonso.epizy.com
E-mail :	marcomartinsafonso@yahoo.com

Estudos e posições

2024 –	Bolsa de investigação em DIME-MASET-TPG, Universidade de Genova (Itália).
2024	Consultoria ocasional em "SIT Technologies", Universidade de Genova (Itália).
2022 – 2023	Investigador Doutorado no "Centro de Matemática da Universidade do Porto" (Portugal).
2015 – 2020	Pós-Doutoramento no "Centro de Matemática da Universidade do Porto" (Portugal). Supervisor : S.M.A. Gama.
2013 – 2014	Pós-Doutoramento no grupo "Instabilité, Turbulence et Contrôle", "Laboratoire de Mécanique, Modélisation et Procédés Propres" (Marseille, França). Supervisor : E. Serre.
2011 – 2013	Pós-Doutoramento no grupo "Analyse, Calcul Scientifique Industriel et Optimisation de Montpellier", "Institut de Mathématiques et de Modélisation de Montpellier" (França). Supervisor : F. Nicoud.

2009 – 2011	Pós-Doutoramento no grupo "Particules, Spray et Combustion", "Institut de Mécanique des Fluides de Toulouse" (França). Supervisor : O. Simonin.
2007 – 2008	Pós-Doutoramento no "Department of Mechanical Engineering", "Johns Hopkins University", Baltimore, MD (EUA). Supervisor : C. Meneveau.
2006 – 2007	Pós-Doutoramento no "Department of Physics of Complex Systems", "Weizmann Institute of Science", Rehovot (Israel). Supervisor : G. Falkovich.
2003 – 2006	Tese de Doutoramento em Física na Universidade de Genova: *Analytical models of turbulence: from large scales to small scales, and beyond.* Orientadores : R. Festa, A. Mazzino, G. Boffetta. Defesa : 22 de Maio 2006.
1997 – 2002	Tese de "Laurea" em Física na Universidade de Genova: "Un modello risolubile analiticamente di Large-Eddy Simulation di campi scalari passivi" (*An analytically solvable model of large-eddy simulation of passive scalar fields*). Orientadores : R. Festa, A. Mazzino. Defesa : 10 de Julho 2002. Nota final : 110/110 cum laude.
1997	Diploma de "Maturità": Liceu Científico "G.D. Cassini" - Genova, nota final 60/60 cum laude.

Estágios e visitas

- *Centro de Matemática da Universidade do Porto.* Novembro–Dezembro 2019. Colaboração com S.M.A. Gama

- *Laboratoire Jean-Alexandre Dieudonné*, Nice (França). Janeiro 2019, Fevereiro 2020 e Novembro 2021. Colaboração com D. Vincenzi

- *University of Helsinki* (Finlândia). Agosto–Setembro 2011. Colaboração com P. Muratore-Ginanneschi

- *Weizmann Institute of Science*, Rehovot (Israel). Janeiro 2006. Colaboração com G. Falkovich

- *Observatoire de la Côte d'Azur*, Nice (França). Dezembro 2004–Abril 2005. Colaboração com U. Frisch

- *Institut Non-Linéaire de Nice*, Valbonne-Sophia-Antipolis (França). Fevereiro–Maio 2004. Colaboração com A. Celani

Palavras chave da minha atividade de investigação

- Mecânica dos fluidos, dinâmica Lagrangiana e Euleriana

- Física teórica, não-linear e estatística

- Turbulência de campos escalares passivos e traçadores no modelo de Kraichnan

- *Coarse-grained models, Large-Eddy Simulations*

- Escoamentos ideais e não-ideais: compressibilidade, anisotropia, inomogeneidade (fonte pontual)

- Polímeros, modelo FENE — equação de Heun e frações contínuas

- Propriedades de transporte de partículas inerciais: aerossóis, gotas, bolhas

- Expansão das escalas múltiplas, algoritmo de segunda quantização

- Formalismo multifractal, teoria de grandes desvios

- Método de *lattice*-Boltzmann, interação fluido–estrutura

- Estatística do campo de velocidade, modelos de fecho para o tensor gradiente

- Efeito da turbulência sobre os micro-organismos em biorreatores

- Jactos granulares em queda, abordagem mesoscópica, modelo a dois fluidos

- Glóbulos vermelhos, membranas biológicas (cápsulas, vesículas)

- Campo eletrostático em fluxos difásicos, efeito dínamo magnético turbulento

- Análise de estabilidade e controlo da separação sobre perfis aerodinâmicos

- Vórtices pontuais bidimensionais, nanofluidos

- *Stall* e *surge* de compressores, recuperação de energia das ondas marinas

Idiomas

Italiano, Inglês, Francês, Português, Genovês, Latim

Software

- ECDL: Microsoft Office e Windows

- LaTeX

- Bom conhecimento da linguagem FORTRAN e das ferramentas Matlab, Mathematica, Maple, Gnuplot, Paraview, Gambit, Freefem++, Simcenter Testlab

- Conhecimentos de HTML, Assembler, DOS, Basic, Pascal, Lotus, C, R, Maxima, Octave, Python, Ansys Fluent

Animação de grupos de trabalho

Animador de dois grupos de trabalho (*Lattice-Boltzmann Method* e *Fluid–Structure Interaction*) entre 2011 e 2013 no I3M - UM2

Habilitações científicas

- *Qualification aux fonctions de Maître de Conférences* (França)

- *Abilitazione Scientifica Nazionale per Professore Associato* (Itália)

Atividade de referências como par avaliador

43 revistas internacionais

- *Journal of Turbulence*

- *Journal of Mathematical Physics*

- *Physical Review* E

- IMA *Journal of Applied Mathematics*

- *Europhysics Letters*

- *Physical Review Letters*

- *Physica* D

- *Physics of Fluids*

- *Meccanica*

- *Symmetry*

- *Fluids*

- *Energies*

- *International Journal of Multiphase Flow*

- *Journal of Fluid Mechanics*

- *Physical Review Research*

- *Monthly Notices of the Royal Astronomical Society*

- *Journal of Nonlinear Science*

- *Physical Review Applied*

- *Sensors*

- *Mathematics*

- *Journal of Dermatology and Skin Science*

- *Minerals*

- *Processes*

- *Electronics*

- *Inventions*

- *Physchem*

- *Microfluidics and Nanofluidics*

- *Lubricants*

- *Fractal and Fractional*

- *Axioms*

- *Sustainability*

- *Algorithms*

- *Applied Sciences*

- *Journal of Marine Science and Engineering*

- *Photonics*

- *Water*

- *Computation*

- *AppliedMath*

- *Micromachines*

- *Information*

- *Magnetochemistry*

- *Contemporary Mathematics*

- *Machines*

2 conferências internacionais

- 2020 European Control Conference

- 2024 63rd IEEE Conference on Decision and Control

Atividade editorial

Guest Editor (com Sílvio Gama) do número especial "Multiscale Turbulent Transport" da revista *Fluids* publicada por MDPI (2018–2019) e do livro homónimo (2020).

Projetos financiados: redação e participação

- Projeto MAGIC ("Multi-Agent Control and Estimation for Multi-Horizon Goals Conciliation") financiado pela *Fundação para a Ciência e a Tecnologia* em 2017 no âmbito *Projetos de Investigação Científica e Desenvolvimento Tecnológico* COMPETE 2020

- "Contributi per l'addestramento di ricercatori presso centri di ricerca di alta qualificazione all'estero" atribuídos pela *Università degli Studi di Genova* em 2004

Participação em júris de tese

Doutoramento de Teresa Daniela Batista de Jesus Grilo, DM-FCUP (21 dezembro 2018)

Supervisão de teses

- Codiretor dos planos de Doutoramento de Gil Miguel Marques e de Tarikul Islam (CMUP, 2022–)

Lista de publicações

H-index: 10; G-index: 15

Revistas internacionais

[27] *Optimization of Thermal Transport of Nanofluids in a Wavy Irregular Enclosure under the Influence of Inclined Periodic MHD*
T. Islam, S. Gama e **M. Martins Afonso**
aceite em *Numerical Heat Transfer, Part* A*: Applications* (2024).

[26] *ANN and RSM-Driven Optimization of Cu-Al_2O_3/Water Hybrid Nanofluid Flow in a Wavy Enclosure with Inclined Periodic MHD Effects*
T. Islam, S. Gama e **M. Martins Afonso**
Mathematics **13** (1), no. 78, pp. 1–44 (2024).
JIF: 2.3; Q1 Mathematics & General Mathematics

[25] *Tracking Point Vortices and Circulations via Advected Passive Particles: An Estimation Approach*
G. Marques, **M. Martins Afonso** e S. Gama
IEEE *Control Systems Letters* **7**, 1760–1765 (2023).
JIF: 2.766; Q1 Control and Optimization & Control and Systems Engineering

[24] *Kazantsev dynamo in turbulent compressible flows*
M. Martins Afonso, D. Mitra e D. Vincenzi
Proceedings of the Royal Society A **475** (2223), no. 20180591, pp. 1–17 (2019).
JIF: 2.410; Q1 Engineering & Mathematics & Physics and Astronomy (miscellanaeous); 10 citações

[23] *Optimal transient growth in an incompressible flow past a backward-slanted step*
M. Martins Afonso, P. Meliga e E. Serre
Fluids **4** (1), no. 33, pp. 1–16 (2019).
JIF: 1.9; 1 citação

[22] *Point-source dispersion of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso e S.M.A. Gama
European Physical Journal E **42** (1), no. 10, pp. 1–8 (2019).
JIF: 1.802

[21] *Eddy diffusivity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, P. Muratore-Ginanneschi, S.M.A. Gama e A. Mazzino
Physical Review Fluids **3** (4), no. 044501, pp. 1–21 (2018).
JIF: 2.021; Q1 Computational Mathematics & Fluid Flow and Transfer Processes & Modeling and Simulation; 3 citações

[20] *Settling velocity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso e S.M.A. Gama
Comptes Rendus Mécanique **346** (2), 121–131 (2017).
JIF 1.029; 2 citações

[19] *Combined role of molecular diffusion, mean streaming and helicity in the eddy diffusivity of short-correlated random flows*
M. Martins Afonso, A. Mazzino e S. Gama
Journal of Statistical Mechanics, 103205, pp. 1–17 (10\)(2016).
JIF 2.091; Q1 Mechanics & Mathematical Physics; 4 citações

[18] *Anomalous diffusion of inertial particles in random parallel flows: theory and numerics face to face*
S. Boi, **M. Martins Afonso** e A. Mazzino
Journal of Statistical Mechanics, P10023, pp. 1–21 (10\)(2015).
JIF 2.091; Q1 Mechanics & Mathematical Physics; 10 citações

[17] *Anomalous diffusion for inertial particles under gravity in parallel flows*
M. Martins Afonso
Physical Review E **89** (6), no. 063021, pp. 1–8 (2014).
JIF 2.252; Q1 Mathematical Physics; 7 citações

[16] *On the damped oscillations of an elastic quasi-circular membrane in a two-dimensional incompressible fluid*
M. Martins Afonso, S. Mendez e F. Nicoud
Journal of Fluid Mechanics **746**, 300–331 (2014).
JIF 2.514; Q1 Mechanics; 6 citações

[15] *Stokes drift for inertial particles transported by water waves*
F. Santamaria, G. Boffetta, **M. Martins Afonso**, A. Mazzino, M. Onorato e D. Pugliese
Europhysics Letters **102** (1), no. 14003, pp. 1–5 (2013).
JIF 1.963; Q1 Multidisciplinary Physics; 36 citações

[14] *Numerical study of substrate assimilation by a microorganism exposed to fluctuating concentration*
M. Linkès, **M. Martins Afonso**, P. Fede, J. Morchain e P. Schmitz
Chemical Engineering Science **81**, 8–19 (2012).
JIF 2.750; Q1 Chemical Engineering; 14 citações

[13] *Eddy diffusivities of inertial particles under gravity*
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